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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,809	07/27/2005	Poopathy Kathirgamanathan	LUC-013	1980
7590 David Silverstein Andover-IP-Law Suite 300 44 Park Street, Andover, MA 01810				
			EXAMINER WILSON, MICHAEL H	
			ART UNIT 1794	PAPER NUMBER
			MAIL DATE 03/12/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,809

Applicant(s)

KATHIRGAMANATHAN ET AL.

Examiner

MICHAEL WILSON

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 64-90 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 64-90 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SI/22)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 20091102

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2 November 2009 has been entered.

Response to Amendment

2. This Office action is in response to Applicant's amendment filed 2 November 2009, which amends claims 64 and 68 and adds new claims 75-90.

Claims 64-90 are pending.

3. The rejection under 35 U.S.C. 102(b) of claims 64, 66-69, 71, 73, and 74 as being anticipated by Thompson et al. (US 6,210,814 B1), is overcome due to Applicant's amending of the claims in the reply filed 2 November 2009.

4. The rejection(s) under 35 U.S.C. 103(a) of claim 65 as being unpatentable over Thompson et al. (US 6,210,814 B1) as applied to claim 64 above and in view of Hirai et al. (US 2001/0028962 A1) is overcome due to applicant's amending of the claims in the reply filed 2 November 2009.

5. The rejection(s) under 35 U.S.C. 103(a) of claim 70 as being unpatentable over Thompson et al. (US 6,210,814 B1) in view of Kido et al. (US 6,396,209 B1) is overcome due to applicant's amending of the claims in the reply filed 2 November 2009.
6. The rejection(s) under 35 U.S.C. 103(a) of claim 72 as being unpatentable over Thompson et al. (US 6,210,814 B1) is overcome due to applicant's amending of the claims in the reply filed 2 November 2009.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
8. Claims 65 and 77 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 65 and 77, the claims recite a list of compounds the dopant is selected from however the list includes "their derivatives." It is unclear what compounds are encompassed by "derivatives."

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 64-69, 73-81, and 85-89 are rejected under 35 U.S.C. 102(e) as being anticipated by Cok (US 6,565,231 B1).

Regarding claims 64-69, 73-81, and 85-89, Cok discloses an electroluminescent device and a method of forming the device (column 9, line 60 to column 10, line 9) comprising an anode and cathode with an organic layer between the electrodes (column 6, lines 15-24). The organic layer comprises a light-emitting layer with zirconium or hafnium quinolate as the host material (column 8, lines 30-50) with a fluorescent dopant (column 8, lines 56-62). The reference discloses the dopant material may be perylene, quinacridone, and coumarin (column 8, lines 56-62). The reference discloses dopants concentrations at can be 0.01 to 10% by weight which overlaps with the presently claimed range (column 8, lines 8-10). A hole transport layer between the anode and the light-emitting layer (column 6, lines 15-25) is disclosed comprising a aromatic amine (column 7) including α -NPD (instant α -NBP) (column 7, line 28) and an electron transport layer between the cathode and the light-emitting layer (column 6, lines 15-25) comprising a metal chelate oxinoid compound (column 8, lines 64-67). The cathode is formed with material selected from lithium, magnesium, magnesium alloys and silver magnesium alloys (column 9, lines 20-43). The anode is formed from ITO glass or plastic (column 6, lines 25-45).

11. Claims 64-67, 69, 71-79, 81, and 83-90 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukuyama et al. (JP 2001-043976 A), machine translation relied upon.

Regarding claims 64-67, 69, 71-79, 81, and 83-90, Fukuyama et al. discloses an electroluminescent device [0016] and a method of forming the device [0019] comprising an anode and cathode with an organic layer between the electrodes [0019]. The organic layer comprises a light-emitting layer with zirconium quinolate ([0033] and [0034]). The reference also discloses the light emitting layer may be doped with a fluorescent dopant [0020] including coumarin [0029] and DPVBi [0033]. A dopant concentration of 1 mol% is disclosed for coumarin [0029]. A hole transport layer between the anode and the light-emitting layer is disclosed comprising an aromatic amine [0027] and an electron transport layer between the cathode and the light-emitting layer [0027] containing zirconium quinolate [0027] or aluminum quinolate [0039]. The cathode is formed with material selected from lithium, aluminum, magnesium, magnesium alloys and silver magnesium alloys [0023]. The anode is formed from ITO glass ([0016]-[0017]).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. Claims 70-72, 82-84, and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cok (US 6,565,231 B1) as applied to claims 66, 78, and 89 above.

Regarding claims 70-72, 82-84, and 90, Cok discloses all the claim limitations as set forth above. Additionally the reference discloses and an electron transport layer between the cathode and the light-emitting layer (column 6, lines 15-25) comprising a metal chelate oxinoid compound (column 8, lines 64-67). While the reference does not explicitly disclose aluminum, lithium, and zirconium quinolates used in the electron transport layer the use of aluminum, lithium, or zirconium quinolate in the electron transport layer would be obvious to one of ordinary skill in the art at the time of the invention given the teachings of Cok as a whole. The reference specifically teaches metal chelated oxinoid compounds, including chelates of oxine itself as preferred material for the electron transport layer (column 8, lines 63-67). The reference also discloses aluminum, lithium, and zirconium quinolates (oxinoids) as useful host materials for the light-emitting layer (column 8, lines 30-49) and further discloses the material to be electron transporting materials (column 8, lines 1-4). Given that the reference teaches oxinoid compounds in general as preferred for the electron transport

layer one of ordinary skill in the art would reasonably expect the specific oxinoid compounds disclosed as electron transporting material for the light-emitting layer to be suitable for the electron transport layer.

15. Claims 68, 70, 80, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyama et al. (JP 2001-043976 A), machine translation relied upon, as applied to claims 67,66, 79, and 78 above and in view of Kido et al. (US 6,396,209 B1).

Regarding claims 68 and 80, Fukuyama et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a hole transport layer between the anode and the light-emitting layer is disclosed comprising a aromatic amine [0027. However the reference does not explicitly disclose wherein the electron transport layer comprises α -NPB.

Kido et al. teach similar organic electroluminescent device (abstract). The reference teaches α -NPB as a hole transport material for the hole transporting layer of a similar organic electroluminescent device (column 9, lines 15-35).

It would be obvious to one of ordinary skill in the art at the time of the invention to use α -NPB in the hole transport layer of Fukuyama et al. given that Kido et al. teach α -NPB, a tetraphenyl benzidine derivative, to be suitable for the hole transport layer while teaches Fukuyama et al. tetraphenyl benzidine derivatives to be suitable for the hole transport layer [0018]. It is well settled that it is *prima facie* obvious to combine two ingredients, each of which is targeted by the prior art to be useful for the same purpose.

In re Lindner 457 F.2d 506,509, 173 USPQ 356, 359 (CCPA 1972). Also, case law holds that "it is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

Regarding claims 70 and 82, Fukuyama et al. disclose all the claim limitations as set forth above. Additionally the reference discloses a hole transport layer between the anode and the light-emitting layer is disclosed comprising a aromatic amine [0027] and an electron transport layer between the cathode and the light-emitting layer [0027] containing zirconium quinolate [0027] or aluminum quinolate [0039]. However the reference does not explicitly disclose wherein the electron transport layer comprises lithium quinolate (Liq).

Kido et al. teach a similar organic electroluminescent device (abstract). The reference teaches using Liq with Alq in an electron injection layer (column 9, lines 59-65). While the reference calls the layer an electron injection layer, it is disclosed as the only layer between the cathode and the light-emitting layer and must inherently perform the function of an electron transport layer, transporting electrons, in order for the device to operate. Therefore the electron injection layer of Kido et al. can also be considered an electron transport layer. The reference teaches using the Liq in the electron injection layer (instant electron transport layer) reduce the barrier to electron injection from the cathode and ensures a low drive voltage for the device (column 2, lines 49-54).

It would be obvious to one of ordinary skill in the art at the time of the invention to use Liq, as taught by Kido et al., in the electron transport layer of Fukuyama et al. One of ordinary skill would reasonably expect such a combination to be suitable given that Kido et al. teach using Liq in an electron transporting layer with Alq in an organic electroluminescent device, and Fukuyama et al. teach Alq is suitable for the electron transport layer. One of ordinary skill would be motivated by a desire to reduce the barrier to electron injection from the cathode and ensures a low drive voltage for the device.

Response to Arguments

16. Applicant's arguments with respect to claims 64-90 have been considered but are moot in view of the new ground(s) of rejection.

17. Applicant's arguments regarding the amendment filed 20 May 2009 which was considered not fully responsive are moot in light of applicant's subsequent response filed 2 November 2009.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794

MHW